

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
ALPBET ANALYSES**

REPORT OF SAMPLE DELIVERY GROUP #1100245

Project: Dimock Residential GW Site, Dimock, PA
Analysis method: Gross Alpha and Beta on Water Samples
Report ID: 1100245-ALPBET
Report type: Original
Date reported: 02/15/2012
Total pages in report: 33

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B2.01332V	FB09	PA:DIMOCK	WATER-DRINKING	02/02/2012	02/03/2012
B2.01333W	HW42Z	PA:DIMOCK	WATER-DRINKING	02/02/2012	02/03/2012
B2.01455F	HW42	PA:DIMOCK	WATER-DRINKING	02/02/2012	02/03/2012
B2.01456G	HW46	PA:DIMOCK	WATER-DRINKING	02/02/2012	02/03/2012
B2.01457H	HW46-P	PA:DIMOCK	WATER-DRINKING	02/02/2012	02/03/2012
B2.01458J	FB08	PA:DIMOCK	WATER-DRINKING	02/01/2012	02/03/2012
B2.01459K	HW34A	PA:DIMOCK	WATER-DRINKING	02/01/2012	02/03/2012
B2.01460C	HW34A-P	PA:DIMOCK	WATER-DRINKING	02/01/2012	02/03/2012
B2.01461D	HW41	PA:DIMOCK	WATER-DRINKING	02/02/2012	02/06/2012
B2.01462E	HW41-P	PA:DIMOCK	WATER-DRINKING	02/02/2012	02/06/2012
B2.01463F	HW28A	PA:DIMOCK	WATER-DRINKING	02/03/2012	02/06/2012
B2.01464G	HW28A-P	PA:DIMOCK	WATER-DRINKING	02/03/2012	02/06/2012
B2.01490J	HW40	PA:DIMOCK	WATER-DRINKING	02/02/2012	02/06/2012
B2.01491K	HW40-P	PA:DIMOCK	WATER-DRINKING	02/02/2012	02/06/2012
B2.01492L	HW39	PA:DIMOCK	WATER-DRINKING	02/03/2012	02/06/2012
B2.01493M	HW39-P	PA:DIMOCK	WATER-DRINKING	02/03/2012	02/06/2012
B2.01494N	FB10	PA:DIMOCK	WATER-DRINKING	02/03/2012	02/07/2012
B2.01495P	HW09	PA:DIMOCK	WATER-DRINKING	02/03/2012	02/07/2012
B2.01496Q	HW09-P	PA:DIMOCK	WATER-DRINKING	02/03/2012	02/07/2012
B2.01497R	HW28B-P	PA:DIMOCK	WATER-DRINKING	02/03/2012	02/07/2012

EXCEPTIONS

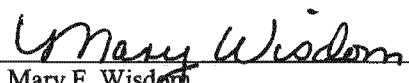
1. **Packaging and shipping**—No problems were observed.
2. **Documentation**—No problems were observed.
3. **Sample preparation**—No problems were encountered.
4. **Analysis**—No problems were encountered.
5. **Holding times**—No holding times were specified.

QUALITY CONTROL

1. **QC samples**—All QC analysis results met NAREL acceptance criteria.
2. **Instruments**—Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

CERTIFICATION

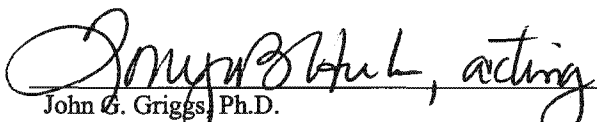
I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.



Mary F. Wisdom
Quality Assurance Manager, NAREL

2-16-12

Date



John G. Griggs, Ph.D.
Director, Center for Environmental Radioanalytical
Laboratory Science

2/16/12

Date

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample (blank spike)
MS	Matrix spike
MSD	Matrix spike duplicate
RBK	Method blank

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "Z scores." A Z score is the number of standard deviations by which the QC result differs from its ideal value. The score is considered acceptable if its absolute value is not greater than 3.

The Z score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference.

The Z score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference. When the precision of paired MS/MSD analyses is evaluated, the native sample activity is subtracted from each measured value and the net concentrations are then converted to total activities before the Z score is computed.

Each standard uncertainty used to compute a Z score includes an additional fixed term to represent sources of measurement error other than counting error. This additional term is not used in the evaluation of reagent blanks.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation.

GENERAL INFORMATION (CONTINUED)

GROSS ALPHA AND BETA ANALYSIS

In comparison to the methods employed to determine radionuclide-specific activities, the method employed by NAREL to determine gross alpha and beta activity in water samples has the potential for greater analytical bias. It should be noted that this potential analytical uncertainty is not included in the two-sigma counting uncertainty term. Therefore, gross alpha and beta results should be used as gross approximations of the alpha and beta activity present.

**U.S.ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100245

ANALYSIS SUMMARY

Analysis Procedure: NAREL GR-01
Title: Gross Alpha and Beta on Water Samples

NAREL Sample #	QC Type	Preparation Procedure	Date Completed	Assay Batch #	QC Batch #
B2.01332V		N/A	02/09/2012	0015696Y	0008442Z
B2.01333W		N/A	02/09/2012	0015696Y	0008442Z
B2.01455F		N/A	02/09/2012	0015696Y	0008442Z
B2.01456G		N/A	02/09/2012	0015696Y	0008442Z
B2.01457H		N/A	02/09/2012	0015696Y	0008442Z
B2.01458J		N/A	02/09/2012	0015696Y	0008442Z
B2.01459K		N/A	02/09/2012	0015696Y	0008442Z
B2.01460C		N/A	02/09/2012	0015696Y	0008442Z
B2.01461D		N/A	02/09/2012	0015696Y	0008442Z
B2.01462E		N/A	02/09/2012	0015696Y	0008442Z
B2.01463F		N/A	02/09/2012	0015696Y	0008442Z
B2.01464G		N/A	02/09/2012	0015696Y	0008442Z
B2.01490J		N/A	02/09/2012	0015696Y	0008442Z
B2.01491K		N/A	02/09/2012	0015696Y	0008442Z
B2.01492L		N/A	02/09/2012	0015696Y	0008442Z
B2.01492L	DUP	N/A	02/09/2012	0015696Y	0008442Z
B2.01493M		N/A	02/09/2012	0015696Y	0008442Z
B2.01494N		N/A	02/09/2012	0015696Y	0008442Z
B2.01494N	MS	N/A	02/09/2012	0015696Y	0008442Z
B2.01495P		N/A	02/09/2012	0015696Y	0008442Z
B2.01496Q		N/A	02/09/2012	0015696Y	0008442Z
B2.01497R		N/A	02/09/2012	0015696Y	0008442Z
LCS-00630529L *	LCS	N/A	02/09/2012	0015696Y	0008442Z
RBK-00630530D *	RBK	N/A	02/09/2012	0015696Y	0008442Z

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

PREPARATION METHOD(S) USED

Procedure ID	Title

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SAMPLE ANALYSIS REPORT

Sample #:	B2.01332V	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	Aqueous		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 11:10	100.0	QA1A	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	5.04e-01	1.0e+00	7.7e-01	PCI/L	02/09/2012 11:10 CST
Beta	1.78e+00	1.2e+00	1.7e+00	PCI/L	02/09/2012 11:10 CST

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SAMPLE ANALYSIS REPORT

Sample #:	B2.01333W	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 11:10	100.0	QA1B	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	-1.47e-01	1.3e+00	1.1e+00	PCI/L	02/09/2012 11:10 CST
Beta	1.63e+00	1.2e+00	1.7e+00	PCI/L	02/09/2012 11:10 CST

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SAMPLE ANALYSIS REPORT

Sample #:	B2.01455F	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 11:10	100.0	QA1C	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.85e-01	1.4e+00	1.2e+00	PCI/L	02/09/2012 11:10 CST
Beta	1.64e+00	1.2e+00	1.8e+00	PCI/L	02/09/2012 11:10 CST

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SAMPLE ANALYSIS REPORT

Sample #:	B2.01456G	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 11:10	100.0	QA1D	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	-3.96e-02	1.6e+00	1.4e+00	PCI/L	02/09/2012 11:10 CST
Beta	4.05e+00	1.4e+00	1.8e+00	PCI/L	02/09/2012 11:10 CST

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SAMPLE ANALYSIS REPORT

Sample #:	B2.01457H	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 11:10	100.0	QA2A	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	-4.46e-01	1.6e+00	1.4e+00	PCI/L	02/09/2012 11:10 CST
Beta	4.71e+00	1.4e+00	1.8e+00	PCI/L	02/09/2012 11:10 CST

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SAMPLE ANALYSIS REPORT

Sample #:	B2.01458J	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	Aqueous		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 11:10	100.0	QA2B	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.91e-01	1.0e+00	8.3e-01	PCI/L	02/09/2012 11:10 CST
Beta	-3.14e-01	8.8e-01	1.4e+00	PCI/L	02/09/2012 11:10 CST

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SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01459K	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 11:10	100.0	QA2C	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	9.66e-01	1.9e+00	1.3e+00	PCI/L	02/09/2012 11:10 CST
Beta	2.12e+00	1.2e+00	1.7e+00	PCI/L	02/09/2012 11:10 CST

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SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01460C	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 11:10	100.0	QA2D	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.89e+00	2.1e+00	1.4e+00	PCI/L	02/09/2012 11:10 CST
Beta	2.51e+00	1.3e+00	1.7e+00	PCI/L	02/09/2012 11:10 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01461D	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 11:15	100.0	QB1A	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	3.32e+00	3.5e+00	2.8e+00	PCI/L	02/09/2012 11:15 CST
Beta	2.06e+00	2.0e+00	3.0e+00	PCI/L	02/09/2012 11:15 CST

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SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01462E	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 11:15	100.0	QB1C	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	2.80e+00	2.3e+00	1.6e+00	PCI/L	02/09/2012 11:15 CST
Beta	3.98e+00	1.5e+00	2.0e+00	PCI/L	02/09/2012 11:15 CST

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SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01463F	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 11:15	100.0	QB1D	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	2.41e+00	1.9e+00	1.4e+00	PCI/L	02/09/2012 11:15 CST
Beta	2.57e+00	1.3e+00	1.8e+00	PCI/L	02/09/2012 11:15 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01464G	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 11:15	100.0	QB2A	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	6.32e-01	1.6e+00	1.5e+00	PCI/L	02/09/2012 11:15 CST
Beta	9.88e-01	1.1e+00	1.7e+00	PCI/L	02/09/2012 11:15 CST

**U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01490J	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 11:15	100.0	QB2B	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.48e+00	2.0e+00	1.7e+00	PCI/L	02/09/2012 11:15 CST
Beta	2.06e+00	1.3e+00	1.9e+00	PCI/L	02/09/2012 11:15 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01491K	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 11:15	100.0	QB2D	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.47e+00	2.0e+00	1.7e+00	PCI/L	02/09/2012 11:15 CST
Beta	1.86e+00	1.3e+00	1.8e+00	PCI/L	02/09/2012 11:15 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01492L	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	5.000e-02 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 13:31	100.0	QC1A	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	2.98e+00	5.7e+00	4.6e+00	PCI/L	02/09/2012 13:31 CST
Beta	2.26e+00	4.4e+00	6.6e+00	PCI/L	02/09/2012 13:31 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01492L	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	5.000e-02 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 13:31	100.0	QC1B	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	5.50e+00	6.7e+00	4.3e+00	PCI/L	02/09/2012 13:31 CST
Beta	5.36e+00	4.8e+00	6.9e+00	PCI/L	02/09/2012 13:31 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01493M	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	5.000e-02 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 13:31	100.0	QC1C	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	2.37e+00	5.7e+00	4.5e+00	PCI/L	02/09/2012 13:31 CST
Beta	8.25e+00	4.8e+00	6.6e+00	PCI/L	02/09/2012 13:31 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01494N	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	Aqueous		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 13:31	100.0	QC1D	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.69e-01	7.9e-01	6.3e-01	PCI/L	02/09/2012 13:31 CST
Beta	6.02e-01	8.6e-01	1.3e+00	PCI/L	02/09/2012 13:31 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01494N	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	MS
Sample description:	N/A		
Comment:	Aqueous		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 13:31	100.0	QC2A	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	8.55e+01	1.8e+01	6.3e-01	PCI/L	02/09/2012 13:31 CST
Beta	6.75e+01	8.5e+00	4.0e+00	PCI/L	02/09/2012 13:31 CST

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01495P	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 13:31	100.0	QC2C	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	-4.16e-02	1.1e+00	1.1e+00	PCI/L	02/09/2012 13:31 CST
Beta	1.64e+00	9.2e-01	1.2e+00	PCI/L	02/09/2012 13:31 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01496Q	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 13:31	100.0	QC2D	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	-1.69e-02	1.1e+00	1.0e+00	PCI/L	02/09/2012 13:31 CST
Beta	1.54e+00	9.2e-01	1.2e+00	PCI/L	02/09/2012 13:31 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	B2.01497R	QC batch #:	0008442Z
Matrix:	WATER-DRINKING	Assay batch #:	0015696Y
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 15:55	100.0	QA1A	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	8.43e-01	1.5e+00	1.1e+00	PCI/L	02/09/2012 15:55 CST
Beta	8.57e-01	1.1e+00	1.7e+00	PCI/L	02/09/2012 15:55 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	LCS-00630529L	QC batch #:	0008442Z
Matrix:	N/A	Assay batch #:	0015696Y
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 15:55	100.0	QA1B	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.74e+01	3.8e+00	2.9e-01	PCI	02/09/2012 15:55 CST
Beta	1.57e+01	1.9e+00	1.1e+00	PCI	02/09/2012 15:55 CST

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100245

SAMPLE ANALYSIS REPORT

Sample #:	RBK-00630530D	QC batch #:	0008442Z
Matrix:	N/A	Assay batch #:	0015696Y
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
02/09/2012 15:55	100.0	QA1C	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.39e-02	3.5e-01	2.9e-01	PCI	02/09/2012 15:55 CST
Beta	7.91e-02	2.7e-01	4.3e-01	PCI	02/09/2012 15:55 CST

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG 1100245

QC BATCH SUMMARY

QC batch #: 0008442Z
Preparation procedure: N/A
Analysis procedure: NAREL GR-01

NAREL Sample #	QC Type	Yield (%)	$\pm 2 \sigma$ Uncertainty (%)	Analyst
B2.01332V		N/A		CHD
B2.01333W		N/A		CHD
B2.01455F		N/A		CHD
B2.01456G		N/A		CHD
B2.01457H		N/A		CHD
B2.01458J		N/A		CHD
B2.01459K		N/A		CHD
B2.01460C		N/A		CHD
B2.01461D		N/A		CHD
B2.01462E		N/A		CHD
B2.01463F		N/A		CHD
B2.01464G		N/A		CHD
B2.01490J		N/A		CHD
B2.01491K		N/A		CHD
B2.01492L		N/A		CHD
B2.01492L	DUP	N/A		CHD
B2.01493M		N/A		CHD
B2.01494N		N/A		CHD
B2.01494N	MS	N/A		CHD
B2.01495P		N/A		CHD
B2.01496Q		N/A		CHD
B2.01497R		N/A		CHD
LCS-00630529L *	LCS	N/A		CHD
RBK-00630530D *	RBK	N/A		CHD

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

**National Air and Radiation Environmental Laboratory
QC Batch Report**

QC Batch #: 0008442Z

Analytical Method: NAREL GR-01

METHOD BLANKS (PCI)

Sample ID	Nuclide	Activity $\pm 2\sigma$	Prep Date	Flags
00630530D	ALPHA	$1.39\text{e-}02 \pm 3.5\text{e-}01$	2012-02-07	OK
00630530D	BETA	$7.91\text{e-}02 \pm 2.7\text{e-}01$	2012-02-07	OK

LABORATORY DUPLICATES (PCI/L)

Sample ID	Nuclide	Original $\pm 2\sigma$	Duplicate $\pm 2\sigma$	RPD	Z
B2.01492L	ALPHA	$2.98\text{e+}00 \pm 5.7\text{e+}00$	$5.50\text{e+}00 \pm 6.7\text{e+}00$	59.42	0.57 OK
B2.01492L	BETA	$2.26\text{e+}00 \pm 4.4\text{e+}00$	$5.36\text{e+}00 \pm 4.8\text{e+}00$	81.28	0.95 OK

MATRIX SPIKES (PCI/L)

Sample ID	Nuclide	Amt Added $\pm 2\sigma$	Native $\pm 2\sigma$	Measured $\pm 2\sigma$	%R	Z
B2.01494N	ALPHA	$6.96\text{e+}01 \pm 2.2\%$	$1.69\text{e-}01 \pm 7.9\text{e-}01$	$8.55\text{e+}01 \pm 1.8\text{e+}01$	122.55	1.75 OK
B2.01494N	BETA	$6.20\text{e+}01 \pm 2.2\%$	$6.02\text{e-}01 \pm 8.6\text{e-}01$	$6.75\text{e+}01 \pm 8.5\text{e+}00$	107.81	1.12 OK

LAB CONTROL SAMPLES (PCI)

Sample ID	Nuclide	Amt Added $\pm 2\sigma$	Measured $\pm 2\sigma$	%R	Z
00630529L	ALPHA	$1.74\text{e+}01 \pm 2.2\%$	$1.74\text{e+}01 \pm 3.8\text{e+}00$	100.16	0.01 OK
00630529L	BETA	$1.55\text{e+}01 \pm 2.2\%$	$1.57\text{e+}01 \pm 1.9\text{e+}00$	101.47	0.23 OK

Analyst:

C/H duP-
duBose, C H

10 Feb 2012

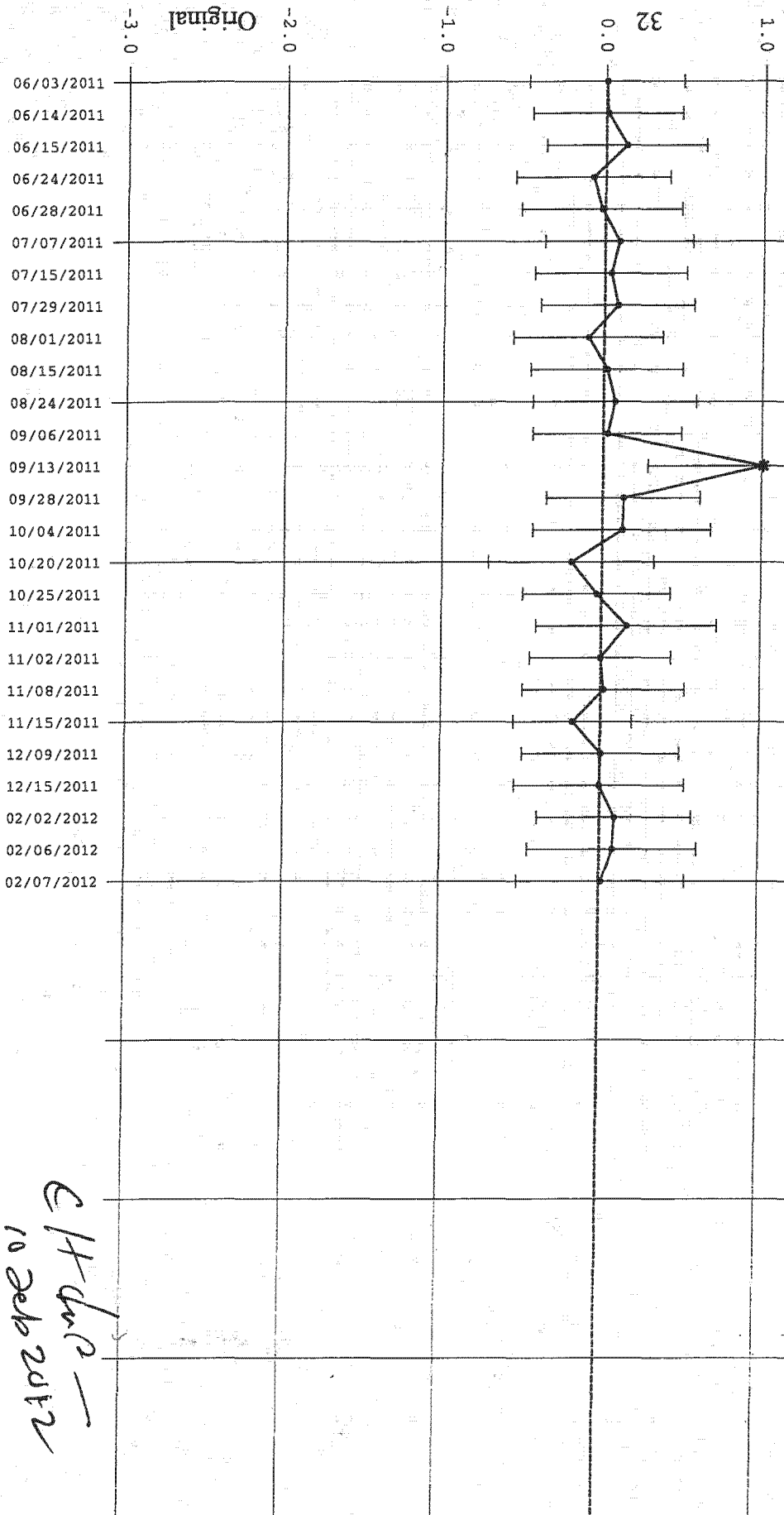
QA Officer:

Kim J. McElroy

2/13/12

Method Blanks
Analyte: ALPHA
Method: NAREL GR-01
Analyst: duBose, C H

Report: 1100245-ALPBET



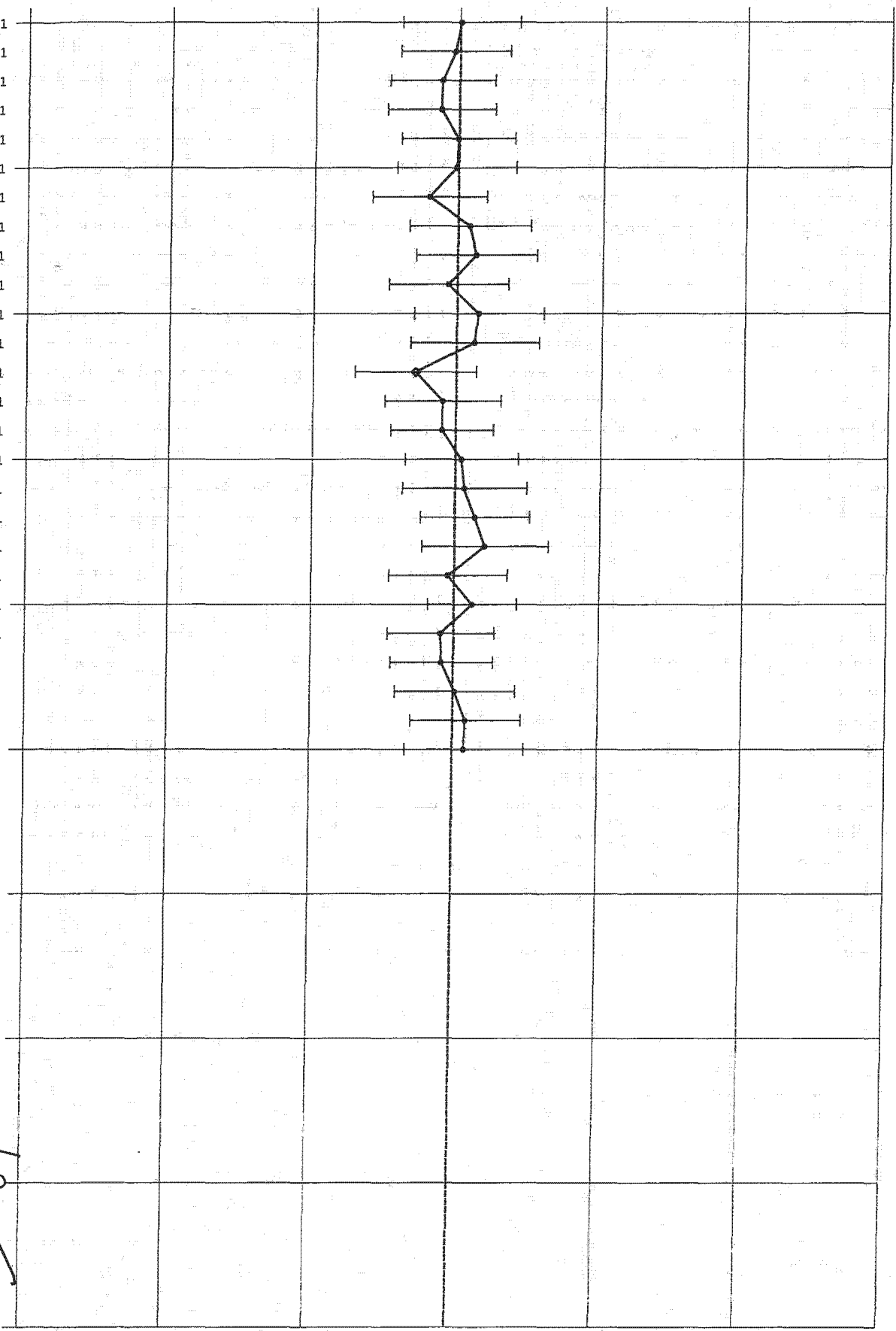
CH duBose
10 Feb 2012

Method Blanks
Analyte: BETA
Method: NAREL GR-01
Analyst: duBose, CH

Report: 1100245-ALPBET

0.0
1.0
3.0
-1.0
-2.0
-3.0
Original

06/03/2011
06/14/2011
06/15/2011
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02/02/2012
02/06/2012
02/07/2012



CH duBose
10 Sep 2012

0.0